FUTURE DIRECTIONS FOR THE ELECTRICITY SUPPLY INDUSTRY

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1. INTRODUCTION

The impact of domestic electricity goes beyond the everyday convenience of turning on a light, a stove, a refrigerator and a colour television. Safe drinking water, telephone services, health care and modern educational facilities and methods all rely on dependable electricity service. Electricity is one of the cheapest, safest and most commonly used energy sources. It is essential for development and individual, social and economic expansion, yet two-thirds of the population of South Africa are not connected to the national power grid.

South Africa has the necessary resources to meet development needs through providing most homes with electricity. A programme of electrification of all houses in South Africa spread over a twenty year period would cost about R820m per year. This estimate represents fractionally over one per cent of the annual budget (1991) of the central state.

Income derived from the sale of electricity can be further invested in the process of electrification. An electricity tax on existing consumers could be used to set up a national electrification fund, similar to the petrol fund, which would be used for investing in electricity in non-electrified areas.

At present, the electricity supply industry in South Africa is based on a national generation and transmission authority (Eskom) with a number of local authority reticulators. Eskom also supplies directly to individual large customers (normally outside municipal areas of jurisdiction) and to about 200 000 small users (mainly white farm supplies and a few local authorities). Its slogan for the 1990s is 'Electricity for All'.

Eskom is the fifteenth biggest electricity supply company in the world:

- It generates just over 60 percent of all electricity on the African continent and 95 percent of all electricity used in South Africa, of which 60 percent is supplied directly to end users and 40 percent indirectly to end users via distributors.

- It supplies electricity directly to 250 000 households out of an estimated 2,5m households with electricity in South Africa.
- Each year, approximately 100 000 new domestic customers are added to the system.
- It has 45 000 employees, with another estimated 80 000 people employed in the industry.
- It is a dominant organization within the South African economy, contributing 5 percent to GDP.

Although Eskom presently has a surplus generating capacity to meet a 13 percent growth, an estimated 23m people or 2,6m households do not have access to electricity. In the homelands the situation is even worse, with less than 10 percent of the population having access to electricity. Future urbanization and population growth over the next 20 years are expected to at least double the current demand for electricity.

Clearly, change is necessary because of the failure of the existing system to meet the basic energy demands of the majority of South Africans. The ongoing boycotts of service charges by black communities from the mid-1980s onwards have politicized the supply of municipal services and led to a fiscal crisis for local government. In debating future scenarios, it may be necessary to go beyond a simple extension of the existing system - a structural overhaul of the entire electricity supply industry is required.

Firstly, changing current regulations might, in turn, mean dismantling certain institutional, political and legal barriers. Secondly, it is imperative that new tariffs are negotiated because the current system mitigates against the disadvantaged sectors of the community. In short, we must take into account the existence of socio-economic needs alongside technical issues, thereby creating a framework of support for those households that cannot presently afford to join the grid.

2. LOCAL AUTHORITY ROLE

Historically, the immense economic and political power wielded by whites in South Africa has resulted in a markedly skewed distribution of state services on a racially discriminatory basis. The electricity

supply industry is one of these services which like most other state provided services in South Africa it exhibits a characteristic duality. While the white urban and rural areas are well provided for and a rudimentary system of supply exists in the black townships, electricity services are almost totally absent in the black rural areas.

For the past forty years Eskom has effectively monopolized the electricity generation, transmission and supply industry in South Africa. However, Eskom is not alone on the supply side of the industry. Four hundred Municipal Electricity Undertakings and a number of Black Local Authorities (BLAs) supply most domestic households.

The prior right of a local authority to distribute electricity within its area of jurisdiction is spelt out in the Electricity Act No 41 of 1987. All the municipalities purchase their electricity in bulk from Eskom and then redistribute it to their constituents. Of the municipal suppliers, over half have less than 1 000 consumers though they are responsible for supplying 90 percent of all domestic electricity usage in South Africa. There are some very fundamental differences between the two forms of local government as supply authorities.

The electricity distribution networks under the auspices of white municipalities have grown in pace with the growth of towns. Consequently, for many municipalities, a large proportion of the electricity supply network has already been paid for and therefore attracts little or no further capital charges. Furthermore, municipalities, because of their localized spatial knowledge and by integrating an electricity supply system with the provision of water supply, transport and roads, sewerage, cleansing, parks and recreation and a host of other services, provide the entire spectrum of household utilities and services. Most municipalities have evolved distribution techniques which are reliable, safe and cost-effective. Most important of all, they have created a network which is suited to the purpose of electricity supply to customers whose houses are all electrified and who utilize an average of about 700 kilowatt hours of electricity per month.

In sharp contrast, the quality of electricity supply by the newly established Black Local Authorities (BLAs) to the townships is a very

different matter. Absolute chaos characterizes their delivery network and administration system (in particular meter reading, billing and collection). Making the BLAs responsible for the distribution, supply and maintenance of the electricity system has created a serious civic crisis. Lacking a financial base, skills, personnel and credibility, the BLA's are incapable of efficiency.

Often, accounts are inaccurate because the meter reading function is not adequately performed by the BLAs and invoices are received over four months in arrears. Where accounts to residents are broken down in terms of electricity consumption and other services (water, sanitation, refuse collection etc.), on receiving payments the BLAs do not allocate these against the services for which they have been charged, but allocate according to their own budgetary needs. Electricity is often a low priority, thus payments may never reach the bulk supplier. A local white municipality may cut services if it is under the impression that the electricity charges have not been paid.

There are few instances where white municipalities are involved in the direct supply of electricity to black domestic users who fall beyond municipal boundaries. In fact, only one local authority has a licensed area of supply extending beyond its boundaries. The City of Durban electricity network encompasses some 48 other local authorities, trust land and self-governed areas. In September 1991, it launched a drive in black areas to electrify 160 000 homes over the next five years at a cost of R500m.

What is commendable about Durban's initiative is not merely the fact that a white local authority is sharing its expertise and administrative resources with underdeveloped black areas but also the fact that this drive is financed by its own Capital Development Fund. For the first time we are seeing the application of concept of 'One city One tax' where electricity is concerned.

3. SKEWED TARIFFS

The effects of the current tariff system are skewed. The 'S-1' tariff was recently introduced to those households with 'ready-board' systems.

Because no installation charge is levied on the individual household owner, the S-1 system allows for the capital costs of distribution and reticulation to be recouped within the tariff structure itself. Such a system would seem to present the best possible scenario whereby individual households can offset installation charges over a lengthy period. Furthermore, this cost is only paid on a usage basis - the more electricity that is consumed, the quicker the installation charge is paid back.

There are a number of problems with this approach, however. The government set a significant precedent when some decades back it committed itself to electrifying most white communities and many white farms. Capital investment costs were in these instances not borne by the newcomers but by all consumers on the national grid.

The method of bulk supply to the townships is another disastrous aspect of the system. In many instances, the BLA, rather than buy its electricity direct from Eskom, is forced to buy from a neighbouring white municipality. White municipalities logically make a profit on the bulk resale of electricity to the BLAs. The increased purchase price of electricity results in a higher tariff in black homes vis-a-vis white homes. Or in some instances, tariffs have been subsidized by the BLA, further straining their financial resource base and limiting their capacity to expand the network.

Preferential rates are being offered to the developed sector in the belief that they aid further industrial expansion. In September 1990, Eskom granted widely publicized 40 percent discounts to corporate customers which exported manufactured products. The underlying assumption is that by subsidizing the electricity requirements of the industrial sector Eskom is helping to stimulate the economy. By implication, therefore, the electrification of black homes must do very little to spur growth in South Africa, for Eskom simultaneously levied a surcharge of almost 40 percent on newly electrified black homes - the S-1 tariff.

Recently, 'tariff-T' was introduced and made applicable to the major users of electricity who 'meet certain criteria'. Whereas domestic electricity prices will increase by only 9 percent in 1992, which in

fairness is 50 percent less than the inflation rate, for many in the industrial sector the increase will only be 7 percent. A lower tariff will apply to those companies and organizations that use electricity during the off-peak period.

The concept of encouraging industry to utilize electricity at a constant rate throughout the day is a good one. The problem lies in the selective nature of the reduced tariff incentive. The exclusion of tariff-T to domestic users may create popular discontent. There is no rational reason why individual homes cannot be offered a similar incentive to utilize electricity during off-peak periods - certainly, Telkom offers this service to telephone users.

4. THE 'READY-BOARD' AND 'PRE-PAID METER' SYSTEM

The most actively propagated solution to the problems of the electricity supply industry is the 'ready-board' and 'pre-paid meter' system.

The 'pre-paid meter' and 'ready-board' concepts were developed to promote mass electrification. They relax unrealistically high safety and quality standards while using a different method of payment to recover installation and running costs. Using these technologies Eskom is electrifying rural and semi-rural communities while the municipalities are extending their supply to township and shack settlements.

The formal connection of a domestic household to the national electricity grid costs over R1 000, and the wiring of a house costs upwards of R1 500. This entry fee is a substantial barrier to the primarily low-income families from rural, township or informal areas. The installation costs are borne by Eskom or the municipality with only a nominal fee levied to be hooked up to the grid. Eskom charges R30 while the Durban City Corporation charges R132 which includes a free two-plate stove to encourage electricity use.

The actual cost of the 'pre-paid meter' and 'ready board' units is R300, while installation costs about R2 000 and upwards depending on the density of housing and proximity to existing electricity supply. The shortfall is recovered via a surcharge on electricity consumption. This is

not a problem providing the newly connected household utilizes electricity for the heavy consumption tasks of cooking and heating of water.

The 'pre-paid meter' installed in the kitchen is activated by inserting a card with a magnetic strip (very similar to a plastic credit card) which has a certain value of electricity encoded. It is installed with a simple distribution board or 'ready board' which has three 15 Amp plug sockets for use by any electrical appliance.

The major advantages from the consumer point of view, is that the 'pre-paid meter' resolves a budgeting problem. Research has shown that for low income homes, the anxiety level of waiting for an account at the end of the month is a major stress factor. Furthermore, it should allow for the consumer to monitor their consumption via a flashing light and warns when the remaining electricity is low, prompting the consumer to purchase another card.

The advantages for the supplier are that the 'ready-board' system is cheap, reliable, easy to administer (the tasks of billing and collection are eliminated) and labour saving. Important also is the fact that bad debts and reconnection costs are eliminated and that minimal costs are incurred during consumer boycotts.

There are, however, a number of basic problems. The 'ready-board' allows for easy distribution of electricity in the room, within which it has been installed, but not to the rest of the house. Plug point outlets for other electrical appliances and wiring for house lights are still a problem and a cost barrier to further electricity usage. Extension leads are used in some instances but are not ideal, while professional installation is expensive. Surprisingly, local entrepreneurs have not yet capitalized on this opportunity to provide low-cost wiring.

Furthermore, depending on the type of 'ready board' system (it varies between electricity suppliers), the house may only be able to access 20 amps. Thus cooking with a two-plate stove may mean no other appliances can be used at the same time without tripping the system. The system can be easily upgraded by an electrician but obviously at a cost.

Electricity is a cheap energy form but usage is not easily monitored compared to a log of wood or a tin of paraffin. For the new electricity user, over-consumption can easily occur due, for instance, to leaving on a stove to provide heat. Although the 'pre-paid meter' indicates (by the rapidity of a flashing light) the amount of electricity being used, the consumer has no measurable means of knowing the exact amount/cost of electricity used per task. A new type of budgeting problem has emerged.

Finally, although most people want electricity, the problem is not one of having a market but rather of affordability. Some of the areas electrified at low cost through these new approaches are experiencing extremely low consumption by newly connected households. This trend will impact on the rapid recovery of the installation costs.

Notwithstanding the above, the major problems with the 'ready-board' and 'pre-paid meter' system however lie not in the technology but in the way that it has been promoted:

- They are being installed on a racial basis - only in black households.
- They have often been used to replace existing meters at a cost to the subscriber.
- They have been used as a 'form' of punishment, via the cost of reconnection, in areas with a record of non-payments or boycotts.
- Their implementation is seemingly on an ad-hoc basis.

Although the 'ready-board' and 'pre-paid meter' system does not address the national problems of delivery, tariff, supply authority or many other issues, the concept remains sound. In this instance it is the method of application and not the technology that is wrong. Many of the past mistakes are being repeated.

5. REFORM PROGRAMME

To eliminate the electricity backlog will require 420 000 connections per annum for the next decade and 220 000 connections per annum for the following decade in order to cater for the urban population growth. Such a task can only be undertaken if there is a major commitment from

the state. A common feature internationally of successful electrification projects is that all were undertaken as the result of a conscious commitment by the government of the country to the task of electrification (In South Africa the logo 'Electricity for All' has come from Eskom and not the state).

Depending on how the electrification drive is implemented, there should be substantial external benefits and economic multiplier effects. Economic growth could be stimulated through the process of redistribution. Finally, investment in electrification can mean future cost-recovery and revenue for the national or regional treasuries.

The restructuring of the electricity supply industry needs to be addressed at two levels: the changing scenario at the regional level and changes at the national level including changing regulations.

5.1 REGIONAL RESTRUCTURING

Discussions for changes have ranged from the suggestion of a complete takeover of all electricity supply undertakings by Eskom - through the creation of regional supply undertakings and/or the formation of community co-operatives - to privatisation in the form of Joint Venture Companies or outright private ownership of either Eskom or regional electricity supply industries. Very little time has been spent addressing the artificial divide between black and white municipalities.

It is unlikely that in a future South Africa municipalities will be structured along racial boundaries or that BLAs will continue to exist. The present fragmentation within metropolitan areas hinders planning, leads to misallocation and underutilization of resources, raises costs and limits possibilities of cross-subsidization between electricity consumers. Either a change in the local government structure is necessary or the uncoupling of electricity supply from local government must occur in order to implement a more rational approach.

A combination of both scenarios is probable. With the **political will** of white municipalities and **political credibility** of governing structures of the black areas, an amalgamation of the electricity supply undertakings

of black and white local municipalities would be logical. In situations where these ingredients are lacking, however, then electricity supply industry and local government must be separated from each other.

Where amalgamation occurs advantages would be numerous. They include:

- A sharing of existent expertise.
- Surpluses realized on the trading accounts of white municipalities could be ploughed into local services to benefits all.
- Through the pooling of capital costs it is easier to extend the existing networks in the white municipalities than to build new systems in black areas.
- Tariff equalization would eliminate perceptions of racial discrimination.

There are two major inhibiting factors. The first is constitutional, in that the law vests the right of electricity supply to BLAs. The second is economic, as many white municipalities are wary of the boycott strategy of non-payment of accounts in black communities.

Black civic associations and other organizations want to participate in discussions on a restructured system of electricity supply so as to ensure community control over the upgrading and development of projects in existing townships. They call for decision-making power over the micro-level design of electricity networks, and control over the process whereby such networks are constructed. They want to be represented on the boards of regional electricity authorities in order to help set local agendas, and on a National Electrification Board in order to participate in the process of setting macro-level policies.

Such calls should be heeded, for in the absence of democratically elected town councils and representative municipalities, community-based organizations are the only form of elected local leadership in most areas lacking electricity.

Nevertheless, it is important to heed the fact that electricity supply in most countries is carried out by highly rationalized, special-purpose,

semi-autonomous, publicly-owned organizations. Municipal electricity authorities are best suited for this purpose. They are in a position to serve a mix of domestic, commercial and industrial consumers, which creates a more even load pattern than any single consumption sector alone. In conjunction, either loosely or in some formal partnership, municipalities with community organizations should be the vehicles to undertake electricity supply in the future.

5.2 NATIONAL RESTRUCTURING

There are three basic options when addressing the issue of restructuring the electricity supply industry (Eskom) at a national level.

The **first option** is to maintain the status quo. This can be rejected outright on the grounds that it does not address any of the pressures for change in contemporary South Africa.

The **second option** is nationalization. Certainly the nationalization of the electricity supply industry may resolve the issues of skills and capital shortages, but experience elsewhere has shown that any gains may be offset by bureaucratic inefficiency.

A derivative option may be to nationalize Eskom but split it up into regional entities each independent of the other. There are strong merits to this approach, for although it shares both the advantages and disadvantages of nationalization at a countrywide level, it does have a strong appeal in that it empowers local government to control their own regions. Moreover, it separates potentially efficient from potentially inefficient local governments.

Furthermore, calls for the communities ownership of their own electricity supply undertakings are beginning to emerge. This is potentially problematic as it is very unlikely that the skills and/or the will exist to operate an 'own affairs' electricity undertaking. Perhaps more pertinent however, is the fact that any mass benefits of scale are lost, as a result of which either high tariffs will have to be imposed or central state subsidies will become the norm. Neither present a healthy situation.

The **third option** deals with the issue of restructuring independently by making provision for the establishment of regulatory mechanisms (statutory or market). These mechanisms would aim at influencing the price and quality performance of distributors - national, regional or community - relative to their end-users. Regulation would direct the optimum customer mix of distributors in order to secure the best average price for all end-users by improving bulk load factors.

Regulation would also guide the authorities involved as to how and where future expansion and investment should occur. It should ensure that electricity network areas should not be determined by political borders but purely by viability and size (manageability) constraints. All vestiges of racially defined electricity networks must be replaced by demographic, social and economic considerations.

Finally, the regulatory authority would also have to examine all existing legislation governing the electrical industry. Over-regulation, on the one hand, involves import prohibitions through outright bans and/or tariffs which have not necessarily been in the best interests of consumers. Under-regulation, on the other hand, has led to a number of 'innovative wiring systems' being accepted as standard. Although new affordable safety standards need to be implemented, a free for all system could develop which would compromising basic safety standards.

6. MARRIAGE OF OBJECTIVES

Currently, more than one-third of Eskom's total expenditures are repayments on foreign debt - of South Africa's total foreign debt of US$20 bn, Eskom has the highest single share at US$3bn. While Eskom has borrowed on foreign markets at exorbitant interest rates, it has simultaneously invested over R4bn in the stock market and other financial markets. It thereby generated R835m in interest receipts in 1990, more than net earnings that year. By February 1992, Eskom, through their Pension Fund, became the biggest institutional owner of shopping centres in the country. The total market value of the Eskom Pension Fund property portfolio is estimated to stand in excess of R1 billion.

The point here is that the business of the National Electricity Supply Commission should be electricity generation, transmission and supply. Any restructuring within Eskom should be undertaken with the clear objective of meeting the ultimate needs of a restructured electricity supply industry.

It is important that economic and market forces should guide the pricing of electricity in South Africa. Electricity need not necessarily be a profit-making undertaking but it should be financially self-generating. Too low a tariff can bankrupt the electricity supply authority, thus creating another inefficient state-run enterprise. Public borrowing for power generation accounts for 20-40 percent of Third-World debt, and emphasizes the failure to reconcile the need for economically and socially acceptable domestic tariffs.

Development needs must enjoy an equal priority. For many South African households in the lower socio-economic strata, access to domestic electricity remains financially out of bounds. Where necessary, electricity usage will have to be subsidized by the public and private sectors. However, the guiding mechanism should be the inability of the consumer, because of socio-economic factors, to pay the minimum tariff levied and not the inability of the electricity supply authority to function profitably. In other words, state subsidies should directly benefit end-users and not the supply authority.

A major electrification drive will have beneficial effects on the rest of the economy through creating an enormous demand for a variety of products and services. The policy of 'growth through redistribution' envisages generating rapid growth in the economy by making large investments in social and infrastructural resources, such as electricity supply.

Socio-political change is a certainty. As democratization proceeds, such change will create new pressures on fiscal resources aimed at redressing socio-economic imbalances. The distorted electricity supply industry is a good example of such an imbalance and therefore will have to be restructured. At the end of the day, political and economic policy choices will be the driving force determining the rate and nature of electrification in South Africa.

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